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December 30, 1976

Mr. M.H. Montgomery, P.E.
Testing and Service Engineers
1152 Richards Street
Salt Lake City, Utah 84101

Re: New Dam located at Shootery, Utah
Hydro-Jet Services, Inc.

Dear Mr. Montgomery:

In response to your letter and enclosure of December 28th, I am sending you the following comments.

Sliding wedge analysis of the dam was suggested at the time in light of the lack of information available for the design specifications for the dam. It is our impression that the dam was built on the Summerville Shale. We do not know how the foundation was prepared prior to raising the dam, but the strata appear to be close to a horizontal attitude and we felt that the foundation materials needed to be examined for horizons that may be possible failure surfaces. This was also our reason for asking that the entire impoundment be sealed with bentonite to preclude seepage along bedding planes in the Summerville Shale. If your investigations have indicated that no possible failure planes are apparent in the foundation and if the entire impoundment will be sealed, we will concur with Dr. Olsen in that sliding wedge analysis may be inappropriate.

Circular failure surface analysis should be done to determine both static and dynamic minimum safety factors.

Our suggestion for seepage analysis was primarily concerned with the effects of water in the dam. We were also concerned with the seepage properties of the surrounding in-situ shale including the affects thereof on the dam foundation, and also of the possibilities of leach solutions escaping the impoundment through thin sand stringers in the shale. Again, as the entire impoundment is relatively small, sealing the entire impoundment may be the best solution to this problem.

In light of Dr. Olsen's investigations of the liquefaction potential of the dam, we feel that seepage analysis of the dam should be addressed

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with the objective of designing the impervious seal on the upstream face. We assumed that the minimum factor of safety analysis will include the effects of the seal.

As you may know, we also suggested that provisions be designed for limiting and diverting storm drainage around the tailings impoundment. This should include a diversion dam in the upper reaches of the present embankment with a suitable spillway. We also suggested that the tailings be run off the upstream side of the impoundment to maintain the pond as far from the main dam as possible. If the above is done, and we were told that it would be done, the diversion dam may at sometime contain the tailings pond and so should be designed with professional engineering assistance. We feel that geological and soils engineering expertise is required in the design stages of facilities of this sort. We will contact Jerry Clark of Hydro-Jet to find out his intentions in this regard.

If I can be of any further assistance please feel free to call on me. To expedite complete understanding on this matter, perhaps I might meet with yourself and Dr. Olsen.

Yours truly,

DIVISION OF OIL, GAS, AND MINING

original signed by Brian W. Buck

Brian W. Buck
Engineering Geologist

BWB/lm

cc: Hydro-Jet Services, Inc.

Caldwell, Richards & Sorensen, Inc.